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Application Note

Clarification of BE1-27/59 Contact States

General Considerations

When ordering, applying, or testing the BE1-27/59 over/undervoltage relay, users often compare the relay characteristic to similar electromechanical devices. This comparison, combined with the output contact arrangement flexibility of the BE1-27/59, has created occasional confusion regarding the expected state of the output contacts under shelf and energized conditions. The purpose of this application note is to clarify the operating principle of the BE1-27/59 relay and assist the user in selecting the output contact arrangement suitable for a particular application.

Electromechanical Over/Undervoltage Relays

Most users have applied electromechanical voltage relays and are intimately familiar with the contact states shown in Figure 1. The NO and NC contact status labels correspond to the shelf, i.e. de-energized, state. *It is customary to use a NO contact for the 59 function and a NC contact for the 27 function.* This contact selection will result in a closed contact for an undervoltage fault condition. Note that with electromechanical relays which offer form C output contacts, it is possible to reverse the contact states and obtain an open contact for an undervoltage condition by selecting the NO contact for the 27 function.

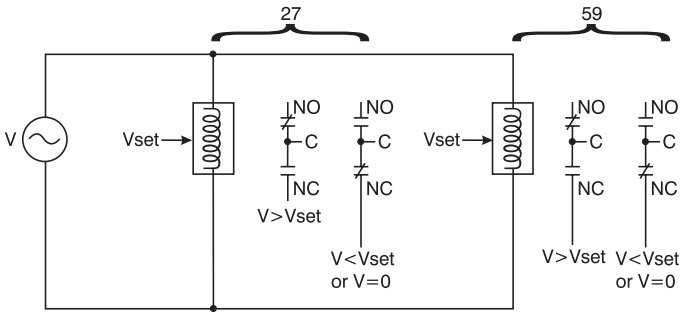

Figure 1 - Electromechanical contact states

BE1-27/59 Operating Principle

The simplified block diagram shown in Figure 2 illustrates the operating principle of the BE1-27/59 relay. In the normal voltage mode, with the over and undervoltage setpoints in the usual positions, the output relays are de-energized. Note in particular that the undervoltage output relay is preceded by an inverter to produce this condition. In other words, under a no-fault condition, the output relays are not picked up. This is, of course, the same when the relay is de-energized. Note that the contact status for the over and undervoltage relay terminals depends on which of the contacts (NO or NC) is wired from the output board to the relay studs. *This choice is up to the user and is made when ordering the relay.*

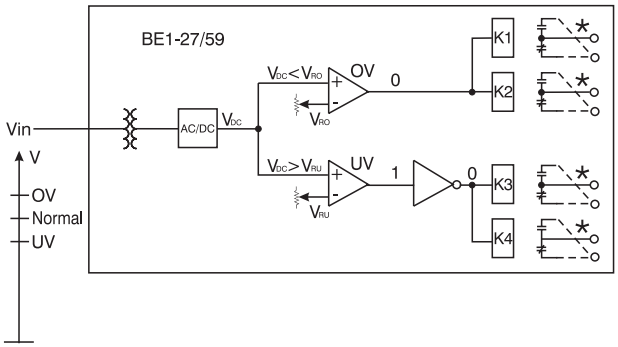

Figure 2 - Simplified Block Diagram, Vin = NORMAL. For normal condition, output contacts are in the same state as for de-energized relay.

Output Contact Specification

When ordering the relay, users must choose which output contact arrangement they prefer for the output and auxiliary relays. *The options listed in the style chart correspond to the contact states in the shelf or no-fault condition.* The output contacts will go in the opposite state under fault conditions (over or undervoltage).

> *The difference between the BE1-27/59 solid state relay and an equivalent electromechanical device is that the undervoltage (fault condition with relay energized) output contact is opposite from the shelf condition.*

Example

To further clarify the selection of output contact options, an example of the contact states in the shelf, normal, and fault conditions is shown (Figure 3) for style number BE1-27/59-A3H-E1Y-A0B1F.

For More Information

For further assistance with product orders or questions, contact Basler Electric Technical Support at 618-654-2341.

For additional information, including more application notes, product bulletins, and instruction manuals, visit www.basler.com, contact your Application Engineer, or contact Technical Support at 618-654-2341.

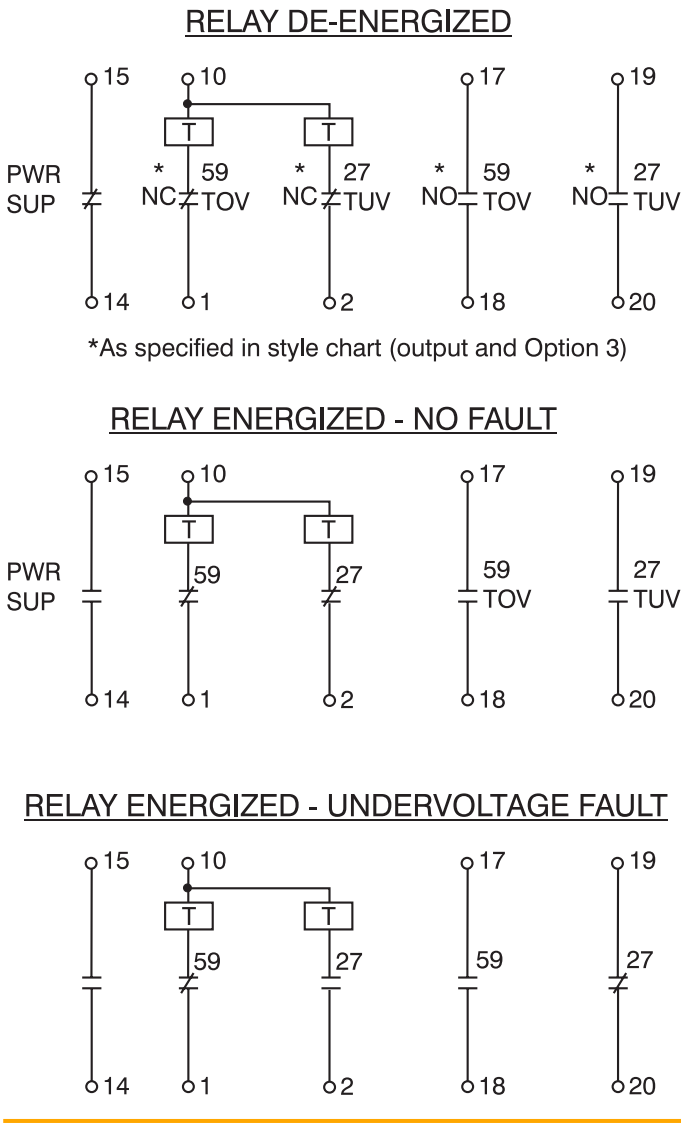

Figure 3 - Example, BE1-27/59-A3H-E1Y-A0B1F

Basler Electric®

Highland, Illinois USA
Tel +1 618.654.2341
Fax +1 618.654.2351
email: info@basler.com

Suzhou, P.R. China
Tel +86 512.8227.2888
Fax +86 512.8227.2887
email: chinainfo@basler.com

Quality System Certification
Basler
ISO 9001:2015